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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :

TAKEYOSHI SHIBASAKI ET AL : ATTN: APPLICATION DIVISION

SERIAL NO: NEW U.S. PCT APPLN :
(Based on PCT/JP01/05252)

FILED: HEREWITH :

FOR: AMORPHOUS FINE SILICA PARTICLE, ITS PRODUCTION PROCESS AND APPLICATION

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to examination on the merits, please amend the above-identified application as follows.

IN THE CLAIMS

Please amend the claims as shown on the marked-up copy following this amendment to read as follows.

1. (Amended) An amorphous fine silica particle made by flame hydrolysis of a silicon compound, wherein said silica particle has an average particle diameter (median diameter) of from 0.1 to 0.7 μm, a specific surface area by BET of from 5 to 30 m^2/g, and a dispersion coefficient (z) of less than 40 as shown in the following formula [I],

$$Z = Y/2X \qquad [I]$$

wherein X is a median size, Y is a particle size range which is from 10% to 90% of an accumulative particle size.

2. (Amended) A filler of an epoxy molding compound, comprising the amorphous fine silica particle according to Claim 1.

3. (Amended) A filler for anti-blocking of a plastic film or sheet, comprising the amorphous fine silica particle according to Claim 1.

4. (Amended) An external additive for a toner, comprising the amorphous fine silica particle according to Claim 1.

5. (Amended) A surface protection layer or an electric charge transportation layer of a photo conductor of an electronic photograph, comprising the amorphous fine silica particle according to Claim 1.

6. (Amended) An amorphous fine silica particle made by a flame hydrolysis of a silicon compound, wherein said silica particle has an average particle diameter (median size) of from 0.1 to 0.7 μm, a specific surface area by BET of from 5 to 30 m^2/g, a dispersion coefficient (z) of less than 40 as shown in the following formula [I], and an absolute value of triboelectrostatic charge to the specific surface area by BET is more than 20 $\mu c/m^2$

$$Z = Y/2X \qquad [I]$$

wherein X is a median size, Y is a particle size range which is from 10% to 90% of an accumulative particle size.

7. (Amended) The amorphous fine silica particle according to Claim 6, wherein said silica particle is surface-treated with a silane coupling agent, an organo-polysiloxane or a combination thereof.

9. (Amended) A development agent for an electronic photograph, comprising the amorphous fine silica particle according to Claim 6.

10. (Amended) A surface protection layer material of a photo conductor, comprising the amorphous fine silica particle according to Claim 6.

11. (Amended) A material of an electric charge transportation layer, comprising the amorphous fine silica particle according to Claim 6.

12. (Amended) A process for producing an amorphous fine silica particle, said process comprising

leading a gaseous silicon compound into a flame to be hydrolyzed to form said particle,

maintaining said silica particle for a time at a temperature greater than the melting point of silica, and

forming said amorphous fine silica particle having an average particle diameter (median size) of from 0.1 to 0.7 μm and a specific surface area of from 5 to 30 m^2/g,

wherein a flame temperature is greater than the melting point of silica and a silica concentration in the flame (v) is more than $0.25kg/Nm^3$.

13. (Amended) The process according to Claim 12, wherein the silica concentration in the flame (v) is from 0.25 to $1.0kg/Nm^3$.

14. (Amended) The process according to Claim 12, wherein a residence time (t) in the flame of the silica particle is from 0.02 to 0.30 seconds.

15. (Amended) The process according to Claim 12, further comprising,

controlling a specific surface area (S), a median size (r), a silica concentration in the flame (v), and a staying time in the flame (t), according to the following formula [II] or [III], respectively.

$$S = 3.52 (v \cdot t)^{-0.4} \qquad [II]$$

$$r = 1.07 (v \cdot t)^{0.4} \qquad [III]$$

REMARKS

Claims 1-15 are active in the present application. Claims 1-15 have been amended for clarity and to remove multiple dependencies. No new matter is added. An action on the merits and allowance of claims is solicited.

Respectfully submitted,

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IN THE CLAIMS

--1. (Amended) An amorphous fine silica particle made by flame hydrolysis of a silicon compound, wherein said silica particle [having, 0.1 - 0.7μm of the] has an average particle diameter (median diameter) of from 0.1 to 0.7 μm, [5 - 30m^2/g of the] a specific surface area by BET of from 5 to 30 m^2/g, and [less than 40 of the] a dispersion coefficient (z) of less than 40 as shown in the following formula [I],

$Z = Y/2X$ [···] [I]

[, where] wherein X is a median size, Y is a particle size range[,] which is from 10% to 90% of an accumulative particle size.

2. (Amended) [The amorphous fine silica particle according to Claim 1, wherein said silica particle is used as a] A filler of [a semiconductor resin-sealing agent] an epoxy molding compound, comprising the amorphous fine silica particle according to Claim 1.

3. (Amended) [The amorphous fine silica particle according to Claim 1, wherein said silica particle is used as a] A filler for anti-blocking of a plastic film or sheet, comprising the amorphous fine silica particle according to Claim 1.

4. (Amended) [The amorphous fine silica particle according to Claim 1, wherein said silica particle is used as an] An external additive [outer additional agent] for a toner, comprising the amorphous fine silica particle according to Claim 1.

5. (Amended) [The amorphous fine silica particle according to Claim 1, wherein said silica particle is used for a] A surface protection layer or an electric charge transportation layer of a photo conductor of an electronic photograph , comprising the amorphous fine silica particle according to Claim 1.

6. (Amended) An amorphous fine silica particle made by a flame hydrolysis of a silicon compound, wherein said silica particle [having, 0.1 - 0.7μm of the] has an average particle diameter (median size) of from 0.1 to 0.7 μm, [5 - 30m^2/g of the] a specific surface area by BET of from 5 to 30 m^2/g, [less than 40 of the] a dispersion coefficient (z) of less than 40 as shown in the following formula [I], and [more than 20$\mu C/m^2$ of the] an absolute value of triboelectrostatic charge to the specific surface area by BET[.] is more than 20 $\mu C/m^2$,

$$Z = Y/2X \text{ [···]} \qquad \text{[I]}$$

[, where] wherein X is a median size, Y is a particle size range which is from 10% to 90% of an accumulative particle size.

7. (Amended) The amorphous fine silica particle according to Claim 6, wherein said silica particle is surface-treated with a silane coupling agent, an [and/or] organo-polysiloxane or a combination thereof.

9. (Amended) A development agent for an electronic photograph, [wherein said agent uses] comprising the amorphous fine silica particle according to Claim 6[, Claim 7, or Claim 8].

10. (Amended) A surface protection layer material of a photo conductor[, wherein said material uses] , comprising the amorphous fine silica particle according to Claim 6[, Claim 7, or Claim 8].

11. (Amended) A material of an electric charge transportation layer[, wherein said material uses] , comprising the amorphous fine silica particle according to Claim 6[, Claim 7, or Claim 8].

12. (Amended) A [production] process [of] for producing an amorphous fine silica particle, said process comprising [by]

leading a gaseous silicon compound into a flame to be hydrolyzed [, the process also comprising,] to form a silica particle,

maintaining said silica particle for a time at a temperature greater than the melting point of silica, and

forming an amorphous fine silica particle having an average particle diameter (median size) of from 0.1 to 0.7 μm and a specific surface area of from 5 to 30 m^2/g,

[setting the] wherein a flame temperature [to be more] is greater than the melting point of silica [, setting the] a silica concentration in the flame [to be] (v) is more than 0.25kg/Nm^3,

[staying the generated silica particle for a short time under the high temperature which is more than melting point of silica, and

making an amorphous silica particle having 0.1 - 0.7μm of the average particle diameter (median size) and 5 - 30m^2/g of the specific surface area].

13. (Amended) The [production] process [of an amorphous fine silica particle] according to Claim 12, wherein the silica concentration in the flame (v) is from 0.25 [-] to 1.0kg/Nm^3.

14. (Amended) The [production] process [of an amorphous fine silica particle] according to Claim 12 [or Claim 13], wherein [the staying] a residence time (t) in the flame of the silica particle is from 0.02 [-] to 0.30 seconds.

15. (Amended) The [production] process [of an amorphous fine silica particle] according to Claim 12[, Claim 13, or Claim 14, the process] further comprising,

controlling [the] a specific surface area (S), [the] a median size (r), a silica concentration in the flame (v), and [the] a staying time in the flame (t), according to the following formula [II] or [III], respectively.

$S = 3.52 (v \cdot t)^{-0.4}$ [······] [II]

$r = 1.07 (v \cdot t)^{0.4}$ [······] [III]--